AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (currently amended) A local performance simulation system comprising:

a signal generation system for simultaneously generating contact recording signals based on vibrations from an ensemble, the ensemble producing an audible ensemble sound pattern;

a signal processing system for channelizing the contact recording signals and generating final instrument signals based on the channelized contact recording signals; and

a reproduction system for generating audible sound waves based on the final instrument signals, wherein a plurality of multi-driver loudspeaker systems have assigned instruments, with one instrument assigned to one loudspeaker system, and the sound waves simulate the ensemble sound pattern with at least one multi-driver loudspeaker system employing a frequency-dependent decision to invert a mixture of instrument signals having different spectral qualities that is provided to its multiple drivers in order to impart a fine structure to its assigned instrument, thereby causing different high frequency harmonics to radiate in directions that change as musical notes change .

2. (original) The simulation system of claim 1 wherein the ensemble includes a plurality of instruments.

3. (original) The simulation system of claim 2 wherein the plurality of instruments includes a string quartet.

4. (original) The simulation system of claim 2 wherein the signal generation system includes a plurality of contact recording configurations.

5. (original) The simulation system of claim 4 wherein each contact recording configuration includes a pair of contact transducers coupled to a corresponding instrument at a location governed by a cross-correlation function as measured in different frequency bands.

6. (original) The simulation system of claim 5 wherein the pair of contact transducers includes:

a first transducer located below an f-hole of the corresponding instrument, the first transducer generating a contact recording signal based on vibrations near the f-hole; and

a second transducer located under a bridge of the corresponding instrument, the second transducer generating a contact recording signal based on vibrations near the bridge.

7. (original) The simulation system of claim 1 wherein the signal processing system includes:

a storage system for storing the contact recording signals to a storage medium as channelized data; and

a retrieval system for retrieving the channelized data from the storage medium.

8. (original) The simulation system of claim 7 wherein the storage system includes:

an analog to digital conversion system for generating digital recording signals based on the contact recording signals; and

a recording system for generating the channelized data based on the digital recording signals, the recording system recording the channelized data to the storage medium.

9. (original) The simulation system of claim 8 wherein the retrieval system includes:

an equalization system for tailoring a frequency response of the channelized data;

a mixing system for generating intermediate instrument signals based on the channelized data;

a digital to analog conversion system for generating final instrument signals based on the intermediate instrument signals; and

an amplifier for amplifying the final instrument signals.

10. (original) The simulation system of claim 2 wherein the reproduction system includes:

a plurality of loudspeaker systems, each loudspeaker system having a corresponding instrument and generating audible sound waves which approximate a frequency dependence of radiation from front, back and side surfaces of the assigned instrument; and

a means for simulating musician absorption of the audible sound waves.

11. (original) The simulation system of claim 10 wherein each loudspeaker system includes:

a front driver having a predetermined front piston diameter for approximating the frequency dependence of radiation from front and side surfaces of the assigned instrument;

a back driver having a predetermined rear piston diameter for approximating the frequency dependence of radiation from back and side surfaces of the assigned instrument.

12. (currently amended) A method for simulating a local performance of an ensemble, the method comprising the steps of:

simultaneously generating contact recording signals based on vibrations from the ensemble, the ensemble producing an audible ensemble sound pattern;

channelizing the contact recording signals;

generating final instrument signals based on the channelized contact recording signals; and

generating audible sound waves with a reproduction system based on the final instrument signals, wherein a plurality of multi-driver loudspeaker systems have assigned instruments, with one instrument assigned to one loudspeaker system, and the sound waves simulate the ensemble sound pattern with at least one multi-driver loudspeaker system employing a frequency-dependent decision to invert a mixture of instrument signals having different spectral qualities that is provided to its multiple drivers in order to impart a fine structure to its assigned instrument, thereby generating different high frequency harmonics that radiate in directions that change as musical notes change .

13. (original) The method of claim 12 wherein the ensemble includes a plurality of instruments.

14. (original) The method of claim 13 wherein the plurality of instruments includes a string quartet.

15. (original) The method of claim 13 further including the step of coupling a pair of contact transducers to a corresponding instrument at a location governed by a cross-correlation function as measured in different frequency bands.

16. (currently amended) A method for tuning a local performance simulation system, the method comprising the steps of:

matching a system overall frequency response to a known overall frequency response;

matching a system coarse asymmetrical frequency response to a known coarse asymmetrical frequency response including:

(a) employing a plurality of loudspeaker systems assigned to instruments, with one instrument assigned to one loudspeaker system;

(b) using separate loudspeaker drivers in the loudspeaker system; and

(c) selecting loudspeaker piston diameters appropriate to an angular dependence of the instrument assigned to the loudspeaker system; and

approximating a system fine asymmetrical frequency response to a known fine asymmetrical frequency response by selecting a weight for giving a mixture of instrument signals having different spectral qualities to the loudspeaker system, and by selecting a frequency-dependent decision to invert the mixture in order to impart a fine structure to its assigned instrument, thereby generating different high frequency harmonics that radiate in directions that change as musical notes change, such that the system overall frequency response, the system coarse asymmetrical frequency response, and the system fine asymmetrical frequency response approximate a frequency response of an audible ensemble sound pattern produced by an ensemble.

17. (previously presented) The method of claim 16 further including the steps of:

selecting an instrument from the ensemble;

playing scales on the instrument;

simultaneously generating a contact recording and a microphone recording based on a sound pattern generated by playing of the instrument; and

comparing spectral characteristics of the contact recording and the microphone recording.

18. (previously presented) The method of claim 16 further including the steps of:

selecting an instrument from the ensemble;

playing scales on the instrument;

generating a contact recording based on a sound pattern generated by playing of the instrument; and

comparing spectral characteristics of the contact recording with a predetermined reference spectrum.

19. (previously presented) The method of claim 16 further including the steps of:

selecting an instrument from the ensemble;

playing scales on the instrument;

generating a contact recording based on a sound pattern generated by playing of the instrument; and

manually adjusting spectral characteristics of the contact recording.

20. (original) The method of claim 16 wherein the ensemble is a string quartet.

21. (New) A sound reproduction system, comprising:

a first multi-driver speaker system having a first plurality of co-located speakers configured to emit sound in a first plurality of radial directions, thereby approximating a first frequency dependence of radiation from front, back and side surfaces of a first assigned instrument, wherein varying piston diameters are selected based on varying surfaces of the first assigned instrument;

a second multi-driver speaker system having a second plurality of co-located speakers configured to emit sound in a second plurality of radial directions, thereby approximating a second frequency dependence of radiation from front, back and side surfaces of a second assigned instrument, wherein varying piston diameters are selected based on varying surfaces of the second assigned instrument; and

a retrieval system adapted to supply a first weighted mixture of spectrally different instrument signals from a channelized recording of the first assigned instrument to the first multi-driver speaker system while employing a first frequency-dependent decision to invert the first mixture in order to impart a first fine structure to the first assigned instrument, and adapted to supply a second weighted mixture of spectrally different instrument signals from a channelized recording of the second assigned instrument to the second multi-driver speaker system while employing a second frequency-dependent decision to invert the second mixture in order to impart a second fine structure to the second assigned instrument.

22. (New) The system of claim 1, further comprising:

a first absorption panel positioned proximately to and relatively behind the first speaker system, wherein the first speaker system has front and rear speakers configured to emit sound in front and rear directions; and

a second absorption panel positioned proximately to and relatively behind the second speaker system, wherein the second speaker system has front and rear speakers configured to emit sound in front and rear directions.